LOWER COLORADO RIVER ACCOUNTING SYSTEM (LCRAS) COMPUTER PROGRAM AND DOCUMENTATION

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ABSTRACT

In 1964, the U.S. Supreme Court gave specific legal rights for the annual use of 7.5 million acre-feet of lower Colorado River water to the States of California, Arizona, and Nevada. In addition, under the Rio Grande, Colorado, and Tijuana Treaty of 1944, 1.5 million acre-feet per year of water must be supplied to Mexico. The water supply of the lower Colorado River is overapportioned. The U.S. Geological Survey, in cooperation with the U.S. Bureau of Reclamation, took a regional approach and developed an accounting system to estimate, distribute, and monitor the annual consumptive use of the water supply.

The Lower Colorado River Accounting System (LCRAS) computer program combines a water-budget estimate of consumptive use by vegetation with estimates of evapotranspiration by diverter from image processing of satellite data. Consumptive use by vegetation along a reach is calculated as the residual in a water budget. Evapotranspiration by diverter is calculated from vegetation types and areas determined from digital-image analysis of satellite data and water-use rates calculated using a modified Blaney-Criddle formula. Prorating consumptive use by vegetation wit the estimates of evapotranspiration by diverter produces a good approximation of consumptive use by vegetation for each diverter.

LCRAS runs on a microcomputer and is written in a modular fashion so that modifications can be made easily as new data, new software, and improved techniques become available. LCRAS also can be used as an annual planning tool. The lower Colorado Rive is divided into four reaches, each beginning and ending at a dam. Each of these four reaches has a separate subroutine that calculates consumptive use by vegetation within that reach by adding all inflow components and subtracting change in reservoir storage and all outflow components except consumptive use. A fifth subroutine allows the river to be treated as a single reach from Hoover Dam to Morelos Dam. Documentation for the LCRAS program describes the modular subroutines and includes data input instructions, narratives, variable lists, flow charts, and code listings of the program.

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